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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,824	11/26/2003	Brian M. Cullum	UMBC-0011	4783

34610 7590 08/14/2006

FLESHNER & KIM, LLP
P.O. BOX 221200
CHANTILLY, VA 20153

EXAMINER	
CHENG, JACQUELINE	
ART UNIT	**PAPER NUMBER**
3768	

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,824	CULLUM ET AL.	
	Examiner	Art Unit	
	Jacqueline Cheng	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-19 and 21-25* is/are rejected.

7)☒ Claim(s) *3,4 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/05 5/04 1/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 8-13, 17-19, and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,694,173 B1 (herein referred to as Bende et al.).

3. **Claims 1, 15, and 18:** Bende et al. discloses using photoacoustic spectroscopy for laser photoablation. Multiple pulses of electromagnetic energy (which could be pulsed by lasers generating a beam of photons (col. 4 line 57-59)) are directed on a volume of biological tissue, generating an acoustic pressure wave. These acoustic wave signals, from the visible, infrared or ultraviolet spectrum (col. 4 line 37-40), are used to create a representative pattern of the target area so that surgeon is able to see the tissue layer they are ablating, reducing the likelihood of invading a deeper layer of tissue (abstract). Although Bende et al. does not explicitly disclose that the image is a spectral image, it is well known in the art that photoacoustic spectroscopy is used to produce a spectral image such as US Patent No. 4,529,319 (herein referred to as Muller) discloses. Muller discloses that it is known to produce, on the basis of photoacoustic spectroscopy, an image display of the absorbing regions of the specimen (col. 1 line 16-23).

4. **Claims 2, 8-10, 12, 13, 17, 19, and 21-24:** Bende et al. discloses that multiple wavelengths within a predetermined range of wavelengths, one in the ultraviolet and one in the

infrared range, are generated from the laser (col. 4 line 45-50). Since the laser can deliver the energy to the target simultaneously, the absorptions of the at least two photons of the different wavelengths is simultaneous (col. 6 line 5-10). The laser beam is directed to desired depth, which can be several millimeters, of where the tissue is to be ablated and viewed (col. 5 line 59-65).

5. **Claims 11 and 25:** Bende et al. discloses using electromagnetic energy in a wavelength range that causes only thermal excitation (diagnostic imaging) (col. 4 line 59-65).

6. **Claims 5-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bende et al. as applied to claim 1 above, and further in view of US Patent No. 4,808,828 (herein referred to as Kitamori et al.). Kitamori et al. discloses that a molecule or atom excited from absorption of light returns to ground state through non-radiative and radiative relaxation processes. The excess energy is released as a photoacoustic signal in the non-radiative relaxation process, and is released as fluorescence in the radiative relaxation process. The photoacoustic effect and the fluorescence generated by a substance are complementary to each other, and therefore it is capable to derive the fluorescent species from the photoacoustic waves in the specimen (col. 1 line 37-col. 2 line 5). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Kitamori et al. with Bende et al. as both inventions are directed to photoacoustic spectroscopy. Kitamori et al. just explains in further detail the deexciting process. Bende et al. only discloses that after excitation, some of the molecules within the tissue will return to the ground state by radiationless processes (col. 6 line 57-59).

7. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bende et al. as applied to claim 1 above, and further in view of 6,567,688 (herein referred to as Wang). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Wang with Bende et al. as both inventions related to biological photoacoustic tissue imaging.

8. **Claim 14:** Wang discloses that photoacoustic waves can be measured by ultrasonic detectors (col. 1 line 25-27). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Wang with Bende et al. as Bende et al. discloses that any transducer that converts pressure waves into mechanical energy or electrical energy may be used in the present invention (col. 7 line 1-5).

9. **Claim 16:** Wang discloses that thermoacoustic imaging may be used to detect early stage cancers.

Allowable Subject Matter

10. Claims 3, 4, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacqueline Cheng whose telephone number is 571-272-5596. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC

BRIAN L. CASLER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700